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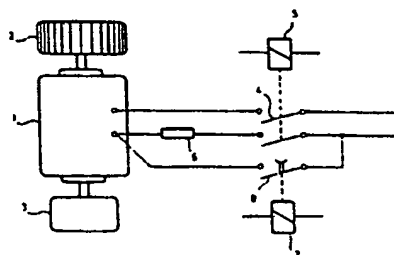
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(54) Method of starting an oil burner unit and oil burner unit.

(57) An oil burner unit comprises an oil pump and a fan which are both driven by the same motor. The pump (3) is of the kind which begins to operate only above a predetermined critical speed. When starting the unit, the motor is first energised by a first current supply circuit having an impedance (8) and thus operated at a reduced number of revolutions at which the pump (3) is out of operation but the fan (2) is working to ventilate the combustion chamber. After the lapse of a predetermined period of time the number of revolutions is increased to cause the pump to operate, whereby the combustion can begin. The changeover is achieved by means of a time delay device which closes a second circuit to increase the motor speed and thereby cause the pump to deliver oil.



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TITLE MODIFIED  
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Method of operating an oil burner and  
apparatus for carrying out the method.

The present invention relates to a method of starting an oil burner unit comprising a fan, a pump, and a motor for driving the fan and the pump.

In known arrangements of this general form, an electric motor is usually used which drives the oil pump as well as the fan for supplying air to the combustion chamber. In certain cases a so called preventilation period is prescribed during the course of starting which means that the fan is to be operated for a certain period of time to ventilate the combustion chamber before the oil supply and the combustion begin. In conventional units this is obtained by means of a solenoid valve which is controlled by a time delay relay and prevents the supply of oil to the pump during, e.g. the first 10 to 15 seconds following the starting of the motor.

The presence of a solenoid actuated valve adds to the complication and expense of the unit and of its maintenance.

The object of the invention is to eliminate the need for the above mentioned solenoid valve, whereby a simplification and a considerable reduction of cost can be obtained.

This invention accordingly provides a method of starting an oil burner unit comprising a fan, a pump, and a motor for driving the fan as well as the pump characterised in that the pump is of the kind (known  
5 per se) which begins to operate only when exceeding a critical rotational speed, and that the motor is first, operated at a lower rotational velocity at which the fan operates but not the pump, whereafter the rotational speed is increased above the critical speed so that the pump begins to operate also.

10 The invention also provides an oil burner unit for carrying out the above mentioned method, comprising a fan, an oil pump and an electric motor for driving the pump and the fan wherein the pump is of the type (known per  
15 se) which delivers liquid only when rotating at or above a critical rotational speed, and that the electric motor is controlled by control gear including a first current supply circuit which operates the motor to drive the pump at a speed below the critical speed, a second  
20 current supply circuit which operates the motor to drive the pump at a speed at or above its critical speed, a start switch which closes the first circuit and a time-delay device which operates closes the second circuit a predetermined time after closure of the first circuit.

There is thus provided a method and apparatus  
25 in which the changeover from the initial pre-ventilation phase to the oil delivery phase is achieved without the cost and inconvenience associated with the use of a solenoid valve.

Suitable pumps for use in carrying out the  
30 invention are known per se, for example from Swedish Patent 335477 which discloses a pump comprising an inner rotor having a number of radially extending bores with respective plungers co-operating at thier outer ends with an outer stator having a cylindrical chamber  
35 disposed eccentrically in relation to the rotor axis.

When the rotor rotates above a critical speed, the plungers are urged outwardly against the stator chamber, the eccentric form of which causes the plungers to be reciprocated within their bores, the inner ends of which  
5 act as positive displacement pumping chambers from which oil is expelled under pressure to a central delivery conduit. When the rotational speed is below the critical speed, the plungers are not thrown out against the stator chamber so that there is no pumping action and no  
10 oil delivery.

The invention is described in more detail below with reference to the accompanying drawing on which an embodiment of an oil burner unit with appurtenant control equipment is shown diagrammatically.

15 The unit illustrated on the drawing comprises an electric motor 1 which is drivingly connected to a fan 2 and a pump 3. The last mentioned is of the kind mentioned above and begins to operate at a critical rotational velocity of 2400 rpm. The fan 2 and the pump  
20 3 are directly connected to the shaft of the motor so as to rotate at the same velocity.

The motor 1 is started by throwing a double switch 4 which closes a first current circuit of the motor through a contact relay 5. A resistor 6 of a suitable  
25 size is provided in the current circuit as a means for reducing the rotational velocity, whereby the motor is caused to operate at about 2200 rpm. At this speed the pump 3 does not operate to deliver oil, but the fan 2 supplies air to the combustion chamber which is thereby  
30 ventilated.

Simultaneously with the closing of the switch 4 a time delay relay 7 is energised which after about 10 seconds closes a switch 8. The motor 1 is thereby  
connected through a second circuit directly to the source  
35 of current, whereby the reducing effect of the resistor 6

upon the rotational velocity ceases and the speed of revolution increases to the normal operating speed of the unit i.e. about 2500 rpm. The pump then starts operating and supplies oil to the combustion chambers and combustion can begin.

5 The speed of the motor may also be controlled otherwise than by means of the resistor mentioned above, eg by means of a condenser or a winding or by thyristor control.

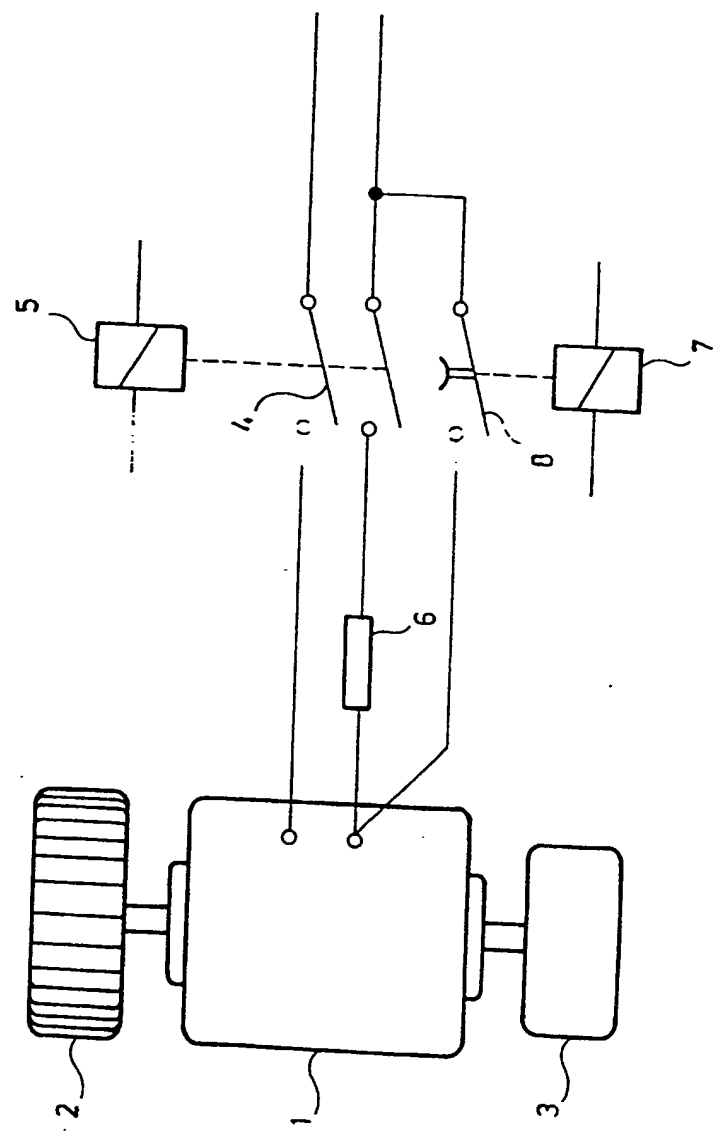
Claims

1. Method of starting an oil burner unit comprising a fan, a pump, and a motor for driving the fan as well as the pump characterised in that the pump is of the kind (known per se) which begins to operate only when exceeding a critical rotational speed and that the motor is first operated at a lower rotational velocity at which the fan operates but not the pump, whereafter the rotational speed is increased above the critical speed so that the pump begins to operate also.

2. Method according to claim 1, characterised by starting the motor by closing a first current supply circuit comprising a means for reducing rotational velocity of the motor and with a predetermined time delay thereafter closing a second current circuit, whereby the rotational velocity of the motor increases to that of normal operation.

3. An oil burner unit comprising a fan, an oil pump and an electric motor which drives the fan and the pump characterised in that the pump is of the type (known per se) which delivers liquid only when rotating at or above a critical rotational speed, and that the electric motor is controlled by control gear including a first current supply circuit which operates the motor to drive the pump at a speed below the critical speed, a second current supply circuit which operates the motor to drive the pump at a speed at or about its critical speed, a start switch which closes the first circuit and a time delay device which operates closes the second circuit a predetermined time after closure of the first circuit.

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# EUROPEAN SEARCH REPORT

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Application number

EP 79302803.5

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl. 8)
Category	Citation of document with indication where applicable of relevant passages	Relevance Priority	
A	<u>AT - E - 295 717 (DANFOSS)</u> + Page 1, lines 1-6; page 3, lines 27-28 + --	1,3	F 23 N 1/00
A	<u>DE - A - 2 058 637 (STENBERG-FLYGT)</u> + Page 1, lines 1-8 + --	1	
A	<u>DE - A - 2 030 714 (COMPAGNIE ELECTRO-MECANIQUE)</u> + Page 1, lines 1-3 + --	1,3	
	<u>DE - A - 1 451 405 (LICENTIA)</u> + Page 2, lines 24-29; page 3, lines 17-19; claims 1,2 + --	1,3	F 23 N 1/00 H 02 P 1/00
	<u>DE - A - 1 763 405 (BOSCH)</u> + Totality + --	1-3	
	<u>DE - E - 1 281 020 (DANFOSS)</u> + Totality + ----	1-3	
			TECHNICAL FIELDS SEARCHED (Int. Cl. 8)
			F 23 N 1/00 H 02 P 1/00
			CATEGORY OF CITED DOCUMENTS
			X: particularly relevant A: technological background O: non-written disclosure I: intermediate document T: theory or principle underlying the invention E: conflicting application U: document cited in the application L: document of other relevance
			member of the same patent family corresponding document
The present search report has been drawn up for all claims			
Place of search VIENNA		Date of completion of the search 27-03-1980	Examiner TSCHELLITSCH



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